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(54) A METHOD FOR THE MANUFACTURING OF AN ABSORBENT STRUCTURE AND AN ABSORBENT ARTICLE FOR BLOOD ABSORPTION COMPRISING AN ABSORBENT STRUCTURE MANUFACTURED ACCORDING TO THIS METHOD

VERFAHREN ZUM HERSTELLEN EINER ABSORBIERENDEN STRUKTUR SOWIE ABSORBIERENDER ARTIKEL ZUR BLUTABSORPTION MIT EINER MIT DIESEM VERFAHREN HERGESTELLTEN STRUKTUR

PROCEDE DE FABRICATION D'UNE STRUCTURE ABSORBANTE ET ARTICLE DESTINE A L'ABSORPTION DE SANG COMPORTANT UNE STRUCTURE ABSORBANTE FABRIQUEE SELON LEIT PROCEDURE

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(56) References cited:
WO-A-90/05808 US-A- 4 610 678

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Description**Background**

[0001] The present invention relates to a method for manufacturing of an absorbent structure in an absorbent article, such as a sanitary napkin, a tampon, a panty protector, a wound or sore dressing and like articles. It also relates to an absorbent article comprising a structure produced by the method.

[0002] Many different types of absorbent articles of this kind are known to the art. The absorbent bodies of such articles are typically produced by dry-defibering and fluffing cellulose pulp in roll, bale or sheet form for instance, to form a pulp mat, sometimes admixed with so-called superabsorbent material in the pulp mat, these absorbents being polymers which are capable of absorbing many times their own weight of water or body fluid.

[0003] The pulp body is often compressed so as to enhance its fluid-dispersion ability and also in order to reduce pulp body bulk and therewith obtain an article which is as compact as possible.

[0004] The absorbent body may also include other constituents, for instance constituents which will improve its fluid-acquisition properties or its fluid-wicking properties, or which will increase its coherent strength, i.e. its coherency, and its ability to withstand deformation in use.

[0005] One serious drawback with products of this nature is found in the total absorption capacity of the articles and also in the fact that the articles will often leak long before their total absorption capacity has been fully utilized. Among other things, this is because the body fluid discharged by the wearer is unable to penetrate into the absorption material and to spread to hitherto unused areas of the article quickly enough, but instead leaks from the sides of the sanitary napkin or the wound dressing. The ability of the materials used in the article to disperse the absorbed fluid throughout the entire absorbent body is thus highly important.

[0006] Another problem resides in so-called rewetting, i.e. the transference of body fluid that has already been absorbed back into contact with the wearer's skin as a result of external forces, for instance when the wearer sits down. It is generally desired that the surface of the article that lies proximal to the wearer in use will remain as dry as possible.

[0007] Another desideratum with regard to the majority of hygiene products is that the article shall be thin, so that it can be worn as discretely as possible.

[0008] A very large part of the production plants used in the manufacture of the aforesaid hygiene articles is comprised of defibrating equipment, pneumatic conveying systems and mat-forming equipment. This equipment is also the source of serious faults in the production plants. Equipment for compressing the finished pulp mat or the finished hygiene product is furthermore

often included downstream of the production plants.

[0009] It is known from International Patent Application WO 90/05808 to produce a pulp web by dry-forming, which is later defibred, so-called dry-formed roll or reel pulp. Flash-dried paper-pulp fibres, which may consist of thermomechanical pulp, chemi-thermomechanical pulp, CTMP, or chemical paper pulp, sulphite or sulphate pulp with a dry solids content of about 80% is delivered by means of an air stream in a controlled flow to a forming head arranged above a forming wire and there formed into a web that has a weight per unit area of 300-1500 g/m² and a density of 550-1000 kg/m³. Air is sucked away through a suction box placed beneath the wire. The moisture content in the process shall be 5-30%.

[0010] The web is pre-pressed to a density of 550-1000 kg/m³ in order to slightly reduce the bulk of the web prior to the final pressing stage. The pressed web has a mechanical strength which enables the web to be rolled-up or handled in sheet form for storage and transportation purposes. The web can be readily defibred and is intended to be converted into fluff for use in the manufacture of absorbent bodies or pads for diapers, sanitary napkins and like articles.

[0011] Another method for the manufacturing of an absorbent structure is described in European Patent 0 122 142, where a mixture of hydrophilic fibres and water insoluble particles of insoluble hydrogel is airlaid into a web and compressed to a density of 0.15 to about 1.0 g/cm². This method however comprises several production steps, where the dry lap base material is first disintegrated into cellulose fibres by use of a hammer mill, whereafter the fibres are deposited on a screen surface and formed to the absorbent structure, which is then compressed. These manufacturing steps make this process rather complicated and expensive.

Summary of the Invention

[0012] The object of the present invention is to provide in an absorbent article of the aforescribed kind an absorbent structure which exhibits extremely good absorption properties, both with respect to its ability to quickly take up fluid and also with respect to its ability to spread fluid throughout the material. The material will preferably exhibit low rewetting tendencies as well as being capable of being made very thin. It is also desired to provide a simplified method of manufacturing absorbent articles of the kind defined in the introduction. These objects and desiderata are achieved with a manufacturing method in which particulate material comprising 30-100%, preferably at least 50% and most preferably at least 70% flash-dried cellulose fibres is dry-formed to a web with a weight per unit area of between 30-1000 g/m² and compressed to a web density of between 0.2-1.0 g/cm³ and where the web without subsequent defibration and fluffing is incorporated as an absorbent structure in an absorbent article.

[0013] Non-defibered, dry-formed roll pulp has been found to be an extremely good absorption material and can be used directly as an absorbent material in hygiene articles, without being defibred. The material also has good fluid dispersion properties and swelling properties, which are meaningful to the function of the product. The pulp mat is very thin and therefore need not be further compressed in the product or article.

[0014] In the case of certain product applications in hygiene articles, it is convenient to soften dry-formed roll pulp prior to its use as an absorption material. The earlier mentioned good absorption properties, fluid wicking properties and swelling properties are not influenced by the softening process to any great extent. One method to soften an absorbent sheet is described in European Patent Application EP 0 360 472, where the compressed absorbent material is worked between partially cutting rollers and thereby gaining softness. This method however leads among other things to decreased strength in the softened material.

Brief Description of the Drawings

[0015] The invention will now be described in more detail with reference to a number of exemplifying embodiments thereof and also with reference to the accompanying drawings, in which:

Figure 1 illustrates the absorption properties of a dry-formed CTMP-material subsequent to being worked between rolls at different roll spacings. Conventionally formed and compressed pulp mats of CTMP-pulp and chemical pulp respectively were used as references.

Figure 2 illustrates the absorption properties of a dry-formed CTMP-material subsequent to being softened. Conventionally formed and compressed mats comprised of CTMP-pulp and chemical pulp respectively were used as references.

Figure 3 illustrates the absorption properties of an absorbent structure produced with dry-formed CTMP, both with and without a superabsorbent admixture. Conventionally manufactured pulp cores both with and without a superabsorbent admixture were used as references.

Figure 4 illustrates the respective rewetting of an unsoftened and a softened absorbent structure in connection with blood absorption which was produced with dry-formed CTMP in the core, both with and without a superabsorbent admixture.

Figure 5 illustrates rewetting of a complete absorbent article in connection with blood absorption which was produced from dry-formed CTMP in the core. Conventionally manufactured products of cor-

responding composition were used as references.

Figures 6-8 illustrate schematically the composition of various exemplifying embodiments of inventive absorbent articles.

Figure 9 illustrates the structure of a cross section of the material in unsoftened condition.

Figure 10 illustrates the structure of a cross section of the material in softened condition.

Description of the Invention

[0016] As before mentioned, important properties of a material used in the manufacture of a hygiene article are its absorbent capacity, absorption rate, dispersion capacity, drainage capacity, retention capacity, rewetting, softness and smoothness.

[0017] The fluids concerned are menstruation blood, blood and fluid matter from wounds and sores.

[0018] The object of the present invention is to provide in an absorbent article such as a sanitary napkin, tampon, panty protector, wound or sore dressing and

like articles, an absorbent structure which exhibits highly effective absorption properties, both with regard to its fluid-aquisition rate and its ability to disperse fluid throughout the material. The material will also preferably have low rewetting and be capable of being made very thin and smooth. It is also desired to simplify the manufacturing process. A finished absorbent material in roll form which can be used without needing to be defibred would partially reduce the need for the earlier mentioned defibering equipment, pneumatic conveying systems and mat-forming equipment, and consequently there is a demand for such material.

[0019] The aforesaid objects and desiderata have been achieved in accordance with the invention by including in the absorbent article an absorbent structure

that is manufactured by a method in which particulate material comprising 30-100%, preferably at least 50% and most preferably at least 70% flash-dried cellulose fibres is dry-formed to a web with a weight per unit area of between 30-1000 g/m² and compressed to a web density of between 0.2-1.0 g/cm³ and where the web without subsequent defibration and fluffing is incorporated as an absorbent structure in the absorbent article.

[0020] In accordance with the invention, there is used a dry-formed product which is manufactured from particulate material as mechanical pulp or chemi-thermomechanical pulp (CTMP) or a corresponding product manufactured from sulphite pulp or sulphate pulp, so-called chemical cellulose pulp. Cellulose fibres which have been stiffened chemically may also be used. In the

dry-formed product can also be included other particulate matter as superabsorbents, thermoplastic binding fibres and other kind of fibres.

[0021] Non-treated dry-formed roll pulp has

extremely good absorption, dispersion and swelling properties, and it has been found possible to use the material immediately as an absorption material in hygiene articles without defibrating the pulp. In the case of certain absorbent articles, it has been found suitable to soften the material slightly prior to its use. One method of softening the material is described below.

[0022] Dry-formed cellulose pulp can be produced, for instance, by forming a web of flash-dried paper pulp fibres in accordance with the method described in International Patent Application WO 90/05808.

[0023] Cellulose pulp fibres have a so-called curl value which defines the crookedness of the fibre. Curl value can be measured according to the method described by B.D. Jordan, N.G. Nguyen in Papper och Trä 4/1986, page 313.

Softening of the Material

[0024] The material can be given a softness which renders the material highly suitable for use as an absorption material in the majority of hygiene articles, by working dry-formed roll pulp between for instance corrugated rolls. The material can be brought to different degrees of softness for different product applications, by working the material between different types of rolls and at different roll spacings.

[0025] Dry-formed roll pulp which has been softened in this way exhibits very good product properties, and the earlier mentioned good absorption properties are not influenced by the softening process to any great extent.

[0026] The material is delaminated in the softening process as illustrated in figures 9 and 10. The unsoftened material 61 has normally an even high density throughout the whole of the thickness of the material. As a result of the softening process the material is delaminated so as to form a plurality of thin fibre layers 62 partially separated by spaces 63.

[0027] Softening and delamination of the material reduces its total density to some extent, although the original web density is essentially retained in each individual layer. Because a very high density is retained in the individual layers, the good fluid wicking properties of the material are retained despite the increase in bulk obtained in conjunction with the softening process. The total bulk is increased by up to 300%, normally 1-100%, as a result of the softening process, depending on the method used and the extent to which the material is softened.

[0028] It will be understood that the aforesaid material softening method has been given solely by way of example and that corresponding results can be achieved with the aid of other methods. For instance, the material could possibly be softened by means of ultrasonic energy, microwaves, by moisturizing the material, or with the aid of chemical additives.

Investigation of Material Properties

[0029] The test equipment described below was used to evaluate absorption properties.

Method 1. Absorption Properties Up an Inclined Plane

[0030] A rectangular test body was punched from the material and a line was drawn transversely across the test body at a point 11 cm from one short end of the body. A fluid container was placed adjacent laboratory scales and both the scales and the container were adjusted to a horizontal position. A plexiglass plate was placed on the scales at a 30° slope, with one free edge of the plate extending slightly down into the container. A line had been drawn transversely across the plate at a point 11 cm from the lower edge of said plate. Test fluid (0.9% NaCl-solution) was poured into the container, until 20 mm of the plexiglass plate was located beneath the surface of the fluid. The test body was secured on the plexiglass plate so that the line drawn on the test body coincided with the line drawn on the plate while, at the same time, folding away the lower part of the test body so as to prevent it from coming into contact with the test liquid. A clock was started at the same time as the test body was laid onto the plate, with the test body extended down into the solution to the same extent as the plate. The increase in weight of the test body with time was recorded.

Method 2. Measurements of Absorption Capacity and Degree of Utilization

[0031] A test product was secured in a fixture. Test fluid (0.9% NaCl-solution) was delivered to the wetting point of the product over a period of 60 minutes at the rate at which the fluid was absorbed. The amount of fluid absorbed was measured continuously and the total amount of fluid absorbed by the product constitutes the utilized absorption capacity of the test product. The test product was then placed in a fluid bath, in which it had the maximum opportunity of absorbing test fluid. The test product was then again weighed and the total absorption capacity calculated. The degree of utilization is given by the quotient between the utilized absorption capacity of the test product and the total absorption capacity.

Method 3. Determining Blood Absorption

[0032] A test body, 65 x 200 mm, was punched from the material. 5 ml test fluid (0.9% NaCl-solution) were delivered to the wetting point on the test body. Dispersion of the fluid was measured after about 30 minutes. A further 5 ml of test fluid (0.9% NaCl-solution) were then delivered to the wetting point and fluid dispersion was measured after about a further 30 minutes. Subsequent to the last delivery, eight filter papers were placed

over the wetting point and loaded with a weight of 4.875 kg for 15 seconds. The filter papers were weighed both before and after applying the load and rewetting was recorded.

Test Results

Softening

[0033] With the intention of investigating how the material was affected at different softening roll spacings when softening the material, a material was tested under different softening conditions. For instance, in the case of a dry-formed CTMP-material having a weight per unit area of 900 g/m² and a density of 0.63 g/cm³, a suitable roll spacing is 1.7-2.4 mm during the softening process. The material is not influenced to any great extent at roll spacings which lie within this range. Figure 1 illustrates the absorption properties at different roll spacings. The results were determined in accordance with Method 1.

- A Material according to the invention, roll spacing 1.7 mm.
- B Material according to the invention, roll spacing 2.0 mm.
- C Material according to the invention, roll spacing 2.4 mm.
- D Material according to the invention, roll spacing 2.0 mm, softened twice.
- E Material according to the invention, roll spacing 2.0 mm, softened four times.
- F CTMP-pulp, density 0.125 g/cm³.
- G Chemical sulphate pulp, density 0.125 g/cm³.

Absorption Properties of Absorbent Structures

[0034] The absorption properties of an inventive CTMP-material having a weight per unit area of 900 g/m² and a density of 0.63 g/cm³ compared with those of corresponding pulp cores produced from conventionally defibred and web-formed CTMP and corresponding chemical pulp are shown in Figure 2. In the absence of superabsorbent material, the absorption capacity is about 9 g of fluid for each gram of absorbent material. The results were determined in accordance with Method 1.

- A Material according to the invention.
- B CTMP-pulp, density 0.125 g/cm³.
- C Chemical sulphate pulp, density 0.125 g/cm³.

Admixing Superabsorbent Material

[0035] The presence of superabsorbent material in an absorbent body will influence the absorption properties of the body. Superabsorbent material can be incorporated in the absorbent body in different ways. For

instance it may be admixed with the body material, laid in layers in the body, or disposed therein in some other way. This admixture of superabsorbent material can be effected in conjunction with manufacturing the dry-formed material, although it may also be effected during some other part of the manufacturing process. The absorption properties were compared with an inventive CTMP-material to which no superabsorbent material had been added and also with corresponding pulp cores comprised of conventional defibred CTMP and chemical pulp. The results of this comparison are shown in Figure 3. The results were determined in accordance with Method 1.

- 5 A Chemical sulphate pulp containing 30% superabsorbent and having a density of 0.125 g/cm³.
- 10 B Inventive material containing 30% superabsorbent.
- 15 C Reference diaper containing 30% superabsorbent.
- 20 D Inventive material containing no superabsorbent.

Rewetting Measurements, Specific for Blood Absorption

[0036] In the case of blood absorption, products which comprised an inventive softened CTMP-material showed better rewetting values than non-softened products. The results also showed that when absorbing blood, products which lacked superabsorbent material exhibited lower rewetting values than material which contained superabsorbent material. Material which lacks superabsorbent material also disperses blood much more effectively. The results can be seen from Figures 4 and 5. The reference products comprised two different products frequently found on the market. The results were determined in accordance with Method 3. The prerequisites for this effect are that at least one layer of the pulp mat is free from superabsorbent material. Of course, this does not exclude the presence of such material in other parts of the absorbent article.

Figure 4

[0037]

- 45 A Inventive material 350 g/m².
- B Inventive material 350 g/m², softened.
- C Inventive material 350 g/m² + 5% superabsorbent.
- 50 D Inventive material 350 g/m² + 5% superabsorbent, softened.

Figure 5

[0038]

- A Reference product 1.
- B Reference product 2.

C Product containing inventive material.

Network Strength

[0039] Dry-formed roll pulp will normally have sufficient mat strength for the product applications intended here. If the network strength of certain product applications should be found insufficient, the network strength can be increased by reinforcing the structure in some suitable manner, by adding reinforcing fibres, binding fibres or binding agent to the cellulose fibre mixture. The network strength can also be increased by incorporating a reinforcing layer of, for instance, plastic, non-woven, net or threads in the absorbent structure, or by fastening a reinforcing layer or an outer sheet on one or both sides of the material.

Density and Weight per unit area

[0040] The softened pulp mat is still very thin, and consequently it is unnecessary in many cases to further compress the mat prior to its use in an absorbent article. A suitable density is 0.2-1.0 g/cm³, preferably 0.3-0.9 g/cm³ and most preferably 0.6-0.8 g/cm³. A suitable weight per unit area is between 30-1000 g/m², preferably 100-800 g/m² and most preferably 200-600 g/m². When calculating the density, the thickness of the material was measured with the aid of a Mitutoyo thickness meter.

Description of a First Exemplifying Embodiment

[0041] Figure 6 illustrates an exemplifying embodiment of an inventive sanitary napkin. The napkin comprises conventionally an absorbent body 21 which is enclosed between a fluid-permeable top sheet 22, which is suitably comprised of perforated plastic film or like material and which lies proximal to the wearer in use, and a fluid-impermeable bottom sheet 23. A thin fluid-permeable layer 27, for instance of non-woven material, may be placed between the absorbent body 21 and the top sheet 22. The sheets 22 and 23 have parts which protrude beyond the absorbent body 21 and the sheets are mutually joined at these protruding parts. The bottom sheet 23 is comprised of a suitable plastic material, for instance polyethylene. It will be understood, however, that other known materials may be used for the top and the bottom sheets within the scope of the invention.

[0042] The absorbent body 21 is comprised of one single layer. This layer may consist of a dry-formed material according to the invention which contains from 0-10% superabsorbent material. A suitable density range in the case of the absorbent body 21 is 0.6-0.9 g/cm³, while a suitable weight per unit area is 200-300 g/m². When the absorbent body is comprised of a CTMP-material or some other material having a yellowish or brownish colour, a covering layer of chemical pulp

white in colour may be applied to the top of the absorbent body.

Description of a Second Exemplifying Embodiment

[0043] Figure 7 illustrates an exemplifying embodiment of an inventive tampon. The tampon is comprised of an inventive absorbent material which has been rolled to a cylinder-like form 38. In conjunction with rolling the absorbent material into its cylindrical shape, a string 31 is placed in the centre of the cylinder 38, in a conventional manner, and the cylinder 38 is compressed to the desired thickness and shape, in a conventional manner. Prior to being compressed and shaped, the absorbent material will suitably have a density range of 0.4-0.9 g/cm³ and a suitable weight per unit area of 200-600 g/m².

Description of a Third Exemplifying Embodiment

[0044] Figure 8 illustrates an exemplifying embodiment of an inventive wound or sore dressing. The dressing includes, in a conventional manner, an absorbent body 41 which is enclosed between a fluid-permeable top sheet 42, which is suitably comprised of a soft non-woven material, a perforated plastic film or the like, and which is intended to lie proximal to the wearer in use, and a fluid-repellent bottom sheet 43. The sheets 42 and 43 have parts which protrude beyond the absorbent body 41 and are joined together at these protruding parts. The bottom sheet 43 is comprised of a suitable fluid-repellent material, for instance a non-woven material that has been made hydrophobic. It will be understood, however, that the top and bottom sheets may comprise other known materials, within the scope of the invention.

[0045] The absorbent body 41 is comprised of only one single layer. This layer may consist of inventive dry-formed material and may be constructed with a relatively open fibre structure of relatively low density and with a superabsorbent content of 0-10%. A suitable density range in respect of the absorbent body 41 is 0.20-0.50 g/cm³ and a suitable weight per unit area is 200-700 g/m².

[0046] It will be understood that the invention is not restricted to the illustrated and described exemplifying embodiments thereof and that other embodiments are conceivable within the scope of the following Claims.

50 **Claims**

1. A method for the manufacturing of an absorbent structure (21,38,41) in an absorbent article, such as a sanitary napkin, tampon, panty protector, wound or sore dressing and like articles, wherein particulate material comprising 30-100%, preferably at least 50% and most preferably at least 70% cellulose fibres is dry-formed to a web (21,38,41) that is

compressed to a web density of between 0.2-1.0 g/cm³, characterized in that the cellulose fibres used have been flash-dried; the web is dry-formed to a web with a weight per unit area of between 30-1000 g/m², and in that the web without subsequent defibration and fluffing is incorporated as an absorbent structure in an absorbent article.

2. A method for the manufacturing of an absorbent structure (21,38,41) according to Claim 1, characterized in that said web is compressed to a web density of between 0.3-0.9 g/cm³, preferably 0.6-0.8 g/cm³.
3. A method for the manufacturing of an absorbent structure (21,38,41) according to any of the preceding Claims, characterized in that the web before being incorporated as an absorbent structure (21,38,41) in an absorbent article is mechanically softened and therewith delaminated, so as to exhibit a plurality of partially separated thin fibre layers (62), which in themselves exhibit a density which corresponds to the web density.
4. An absorbent article intended for absorbing blood, which comprises an absorbent body including an absorbent structure (21,38,41) comprising particulate material containing 30-100%, preferably at least 50% and most preferably at least 70% cellulose fibres dry-formed to a web and compressed to a web density of between 0.2-1.0 g/cm³, characterized in the cellulose fibres used having been flash-dried; the web having been dry-formed to a web with a weight per unit area of between 30-1000 g/m² and included as absorbent structure in the article without any subsequent defibration and fluffing.
5. An absorbent article according to claim 4, characterized in that the absorbent body is enclosed between a liquid-permeable top sheet (42) and an essentially liquid-impermeable bottom sheet (43).
6. An absorbent article according to Claim 4 or 5, characterized in that the weight per unit area of the absorbent structure (21,38,41) is between 100-800 g/m², preferably 200-600 g/m².
7. An absorbent article according to one or more of Claims 4-6, characterized in that the cellulose fibres are mainly comprised of fibres of chemi-thermomechanically produced pulp.
8. An absorbent article according to Claim 7, characterized in that the chemi-thermomechanical pulp fibres have a curl value of between 0.20 and 0.40.
9. An absorbent article according to Claim 7 or 8,

characterized in including 0-15% superabsorbent material, calculated on the total weight of the absorbent structure (21,38,41) in a dry state.

- 5 10. An absorbent article according to one or more of Claims 4-9, characterized in that at least a portion of the fibres are chemically stiffened cellulose fibres.
- 10 11. An absorbent article according to one or more of Claims 4-10, characterized in that the structure (21,38,41) includes reinforcing means, for instance binding agent, reinforcing fibres or thermoplastic binding fibres.
- 15 12. An absorbent article according to one or more of Claims 4-11, characterized in that the structure (21,38,41) includes a reinforcing layer of non-woven, tissue, plastic or net material for instance.
- 20 13. An absorbent article according to one or more of Claims 4-12, characterized in that the absorbent structure (21,38,41) is covered with a layer of chemical pulp on one side thereof.

Patentansprüche

1. Verfahren zur Herstellung einer absorbierenden Struktur (21, 38, 41) in einem absorbierenden Artikel, wie beispielsweise eine Damenbinde, ein Tampon, ein Höschenschutz, ein Wundverband und ähnliche Artikel, bei dem ein Partikelmaterial mit 30-100%, vorzugsweise wenigstens 50% und am bevorzugtesten wenigstens 70% Zellulosefasern zu einer Bahn (21, 38, 41) trockengeformt wird, die auf eine Bahndichte zwischen 0,2 - 1,0 g/cm³ zusammengedrückt wird, dadurch gekennzeichnet, dass die verwendeten Zellulosefasern schnellgetrocknet wurden, die Bahn zu einer Bahn mit einem Flächengewicht zwischen 30 - 1000 g/m² trockengeformt wird und die Bahn ohne nachfolgende Zerfaserung und Fluffen [fluffing] als absorbierende Struktur in einen absorbierenden Artikel eingegliedert wird.
- 30 40 45 2. Verfahren zur Herstellung einer absorbierenden Struktur (21, 38, 41) nach Anspruch 1, dadurch gekennzeichnet, dass die Bahn auf eine Bahndichte zwischen 0,3 - 0,9 g/cm³, vorzugsweise 0,6 - 0,8 g/cm³ zusammengedrückt wird.
- 50 55 3. Verfahren zur Herstellung einer absorbierenden Struktur (21, 38, 41) nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass die Bahn, bevor sie als absorbierende Struktur (21, 38, 41) in einen absorbierenden Artikel aufgenommen wird, mechanisch erweicht und hierdurch delaminiert wird, so dass sie mehrere teilweise

getrennte dünne Faserschichten (62) aufweist, die selbst eine Dichte haben, die der Bahndichte entspricht.

4. Absorbierender Artikel, der zum Absorbieren von Blut bestimmt ist, mit einem absorbierenden Körper, der eine absorbierende Struktur (21, 38, 41) mit Partikelmaterial enthält, das 30-100%, vorzugsweise wenigstens 50% und am bevorzugtesten wenigstens 70% Zellulosefasern enthält, die zu einer Bahn trockengeformt und auf eine Bahndichte zwischen 0,2 - 1,0 g/cm³ zusammengedrückt sind, dadurch gekennzeichnet, dass die verwendeten Zellulosefasern schnellgetrocknet wurden, die Bahn zu einer Bahn mit einem Flächengewicht zwischen 30 - 1000 g/m² trockengeformt wurde und ohne nachfolgende Zerfaserung und Fluffen (fluffing) als absorbierende Struktur in dem Artikel eingegliedert ist. 5

5. Absorbierender Artikel nach Anspruch 4, dadurch gekennzeichnet, dass der absorbierende Körper zwischen einer flüssigkeitsdurchlässigen Oberlage (42) und einer im wesentlichen flüssigkeitsundurchlässigen Bodenlage (43) eingeschlossen ist. 10

6. Absorbierender Artikel nach Anspruch 4 oder 5, dadurch gekennzeichnet, dass das Flächengewicht der absorbierenden Struktur (21, 38, 41) zwischen 100 - 800 g/m², vorzugsweise 200 - 600 g/m² beträgt. 20

7. Absorbierender Artikel nach einem oder mehreren der Ansprüche 4 - 6, dadurch gekennzeichnet, dass die Zellulosefasern hauptsächlich aus Fasern aus chemithermomechanisch hergestelltem Zellstoff bestehen. 25

8. Absorbierender Artikel nach Anspruch 7, dadurch gekennzeichnet, dass die chemithermomechanisch hergestellten Zellstofffasern, einen Curl-Wert zwischen 0,20 und 0,40 haben. 30

9. Absorbierender Artikel nach Anspruch 7 oder 8, dadurch gekennzeichnet, dass 0-15% superabsorbierendes Material enthalten sind, berechnet auf das Gesamtgewicht der absorbierenden Struktur (21, 38, 41) in trockenem Zustand. 45

10. Absorbierender Artikel nach einem oder mehreren der Ansprüche 4-9, dadurch gekennzeichnet, dass wenigstens ein Teil der Fasern chemisch versteifte Zellulosefasern sind. 50

11. Absorbierender Artikel nach einem oder mehreren der Ansprüche 4-10, dadurch gekennzeichnet, dass die Struktur (21, 38, 41) Verstärkungsmittel enthält, beispielsweise Bindemittel, Verstärkungsfasern oder thermoplastische Bindefasern. 55

12. Absorbierender Artikel nach einem oder mehreren der Ansprüche 4-11, dadurch gekennzeichnet, dass die Struktur (21, 38, 41) eine Verstärkungsschicht aus beispielsweise Vlies, Tissue, Kunststoff- oder Netzmaterial enthält.

13. Absorbierender Artikel nach einem oder mehreren der Ansprüche 4-12, dadurch gekennzeichnet, dass die absorbierende Struktur (21, 38, 41) auf einer Seite hiervon mit einer Schicht aus chemischem Zellstoff bedeckt ist.

15 Revendications

1. Procédé pour fabriquer une structure absorbante (21, 38, 41) dans un article absorbant tel qu'une serviette hygiénique, un tampon périodique, un protège-slip, un pansement ou compresse, et autres articles similaires, dans lequel un matériau particulier comprenant de 30 à 100 %, de préférence au moins 50 % et mieux encore, au moins 70 % de fibres de cellulose, est formé à sec en une nappe (21, 38, 41) qui est comprimée jusqu'à obtenir une masse volumique de nappe de 0,2 à 1,0 g/cm³, caractérisé en ce que les fibres de cellulose utilisées ont été séchées instantanément ; la nappe est formée à sec en une nappe dont la masse par unité de surface vaut de 30 à 1000 g/m² et en ce que la nappe, sans défibrage et formation de fluff ultérieurs, est incorporée comme structure absorbante dans un article absorbant. 30
2. Procédé pour fabriquer une structure absorbante (21, 38, 41) selon la revendication 1, caractérisé en ce que ladite nappe est comprimée jusqu'à obtenir une masse volumique de nappe de 0,3 à 0,9 g/cm³, de préférence de 0,6 à 0,8 g/cm³. 35
3. Procédé pour fabriquer une structure absorbante (21, 38, 41) selon l'une quelconque des précédentes revendications, caractérisé en ce que la nappe, avant d'être incorporée comme structure absorbante (21, 38, 41) dans un article absorbant, est soumise à un ramollissement mécanique et à un délamination associé, de manière à présenter une pluralité de couches minces fibreuses partiellement séparées (62) qui ont en elles-mêmes une masse volumique correspondant à la masse volumique de nappe. 40
4. Article absorbant destiné à absorber du sang, qui comprend un corps absorbant comprenant une structure absorbante (21, 38, 41) qui comprend un matériau particulier contenant de 30 à 100 %, de préférence au moins 50 % et mieux encore au moins 70 % de fibres de cellulose, formé à sec en 45

une nappe et comprimé jusqu'à obtenir une masse volumique de nappe de 0,2 à 1,0 g/cm³, caractérisé en ce que les fibres de cellulose utilisées ont été séchées instantanément ; la nappe a été formée à sec en une nappe dont la masse par unité de surface va de 30 à 1 000 g/m² et elle est comprise comme structure absorbante dans l'article sans de quelconques défibrage et mise sous forme de fluff ultérieurs.

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5. Article absorbant selon la revendication 4, caractérisé en ce que le corps absorbant est enfermé entre une feuille supérieure perméable aux liquides (42) et une feuille inférieure essentiellement imperméable aux liquides (43).
6. Article absorbant selon la revendication 4 ou 5, caractérisé en ce que la masse par unité de surface de la structure absorbante (21, 38, 41) va de 100 à 800 g/m², de préférence de 200 à 600 g/m².
7. Article absorbant selon une ou plusieurs des revendications 4 à 6, caractérisé en ce que les fibres de cellulose comprennent principalement des fibres de pâte produite par voie chimico-thermomécanique.
8. Article absorbant selon la revendication 7, caractérisé en ce que les fibres de pâte chimico-thermomécanique présente une valeur de frisure de 0,20 à 0,40.
9. Article absorbant selon la revendication 7 ou 8, caractérisé en ce qu'il comprend de 0 à 15 % de matériau superabsorbant par rapport au poids total de la structure absorbante (21, 38, 41) à l'état sec.
10. Article absorbant selon une ou plusieurs des revendications 4 à 9, caractérisé en ce qu'au moins une partie des fibres sont des fibres de cellulose chimiquement rigidifiées.
11. Article absorbant selon une ou plusieurs des revendications 4 à 10, caractérisé en ce que la structure (21, 38, 41) comprend un agent de renforcement, par exemple, un agent liant, des fibres de renforcement ou des fibres liantes thermoplastiques.
12. Article absorbant selon une ou plusieurs des revendications 4 à 11, caractérisé en ce que la structure (21, 38, 41) comprend une couche de renforcement de non-tissé, de tissu, d'un matériau plastique ou d'un matériau en forme de filet, par exemple.
13. Article absorbant selon une ou plusieurs des revendications 4 à 12, caractérisé en ce que la structure absorbante (21, 38, 41) est recouverte d'une couche de pâte chimique sur l'une de ses faces.

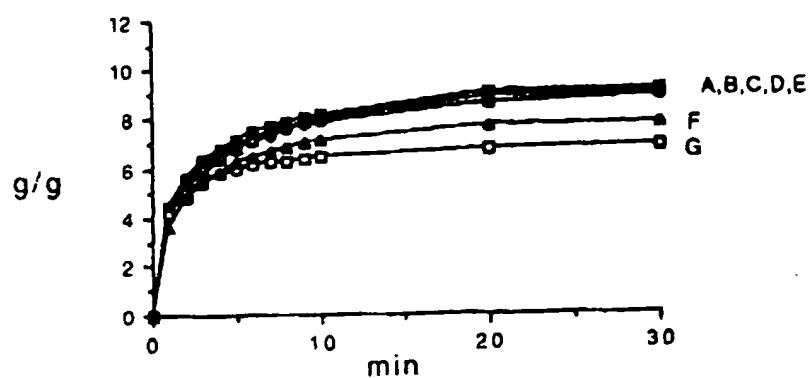


figure 1

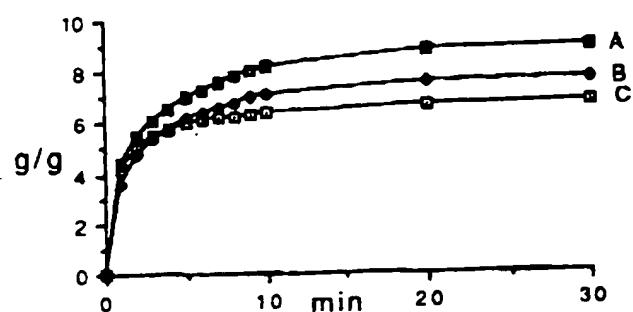


figure 2

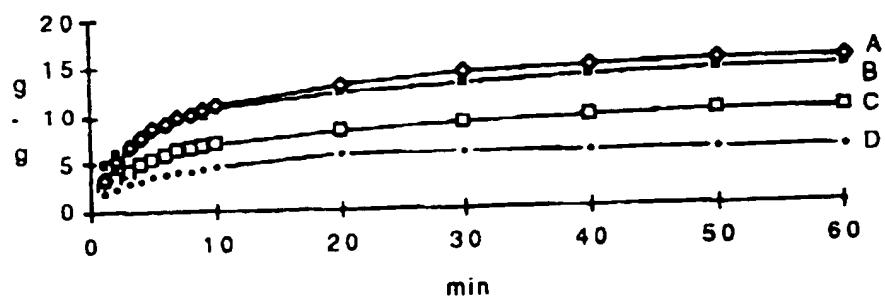


figure 3

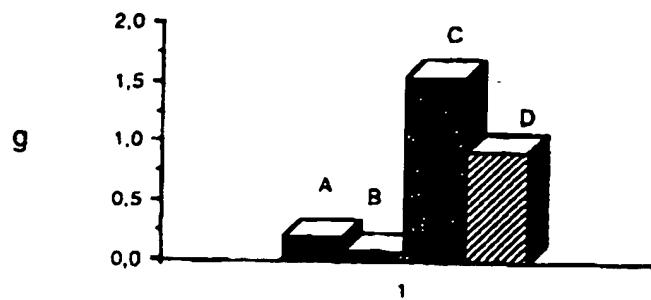


figure 4

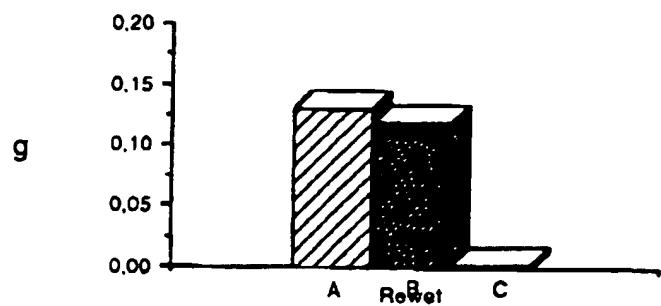


figure 5

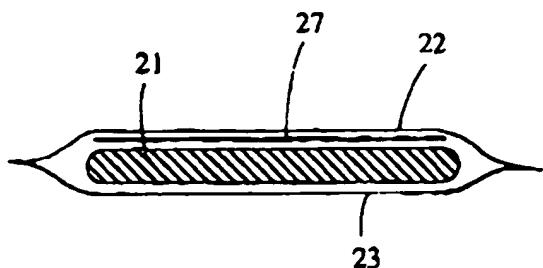


Figure 6

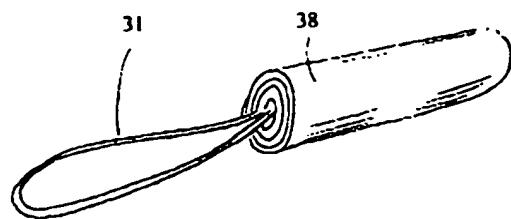


Figure 7

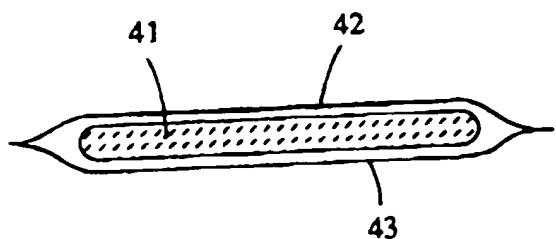


Figure 8



Figure 9

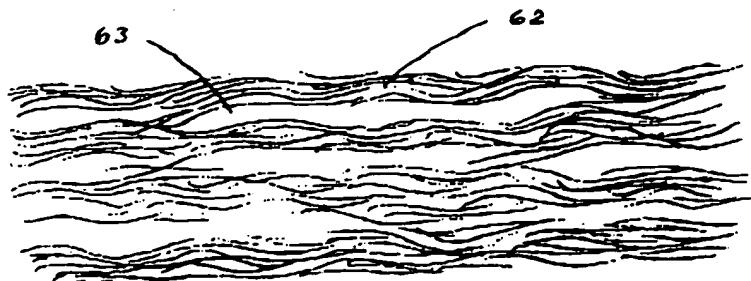


Figure 10